APPARATUS, SYSTEM, AND METHOD FOR GRID BASED DATA STORAGE
Joseph J. Fatula
IBM Docket No.: SJO9-2003-0055US1 (BWB)
Kunzler & Associates Docket No.: 1200.2.94
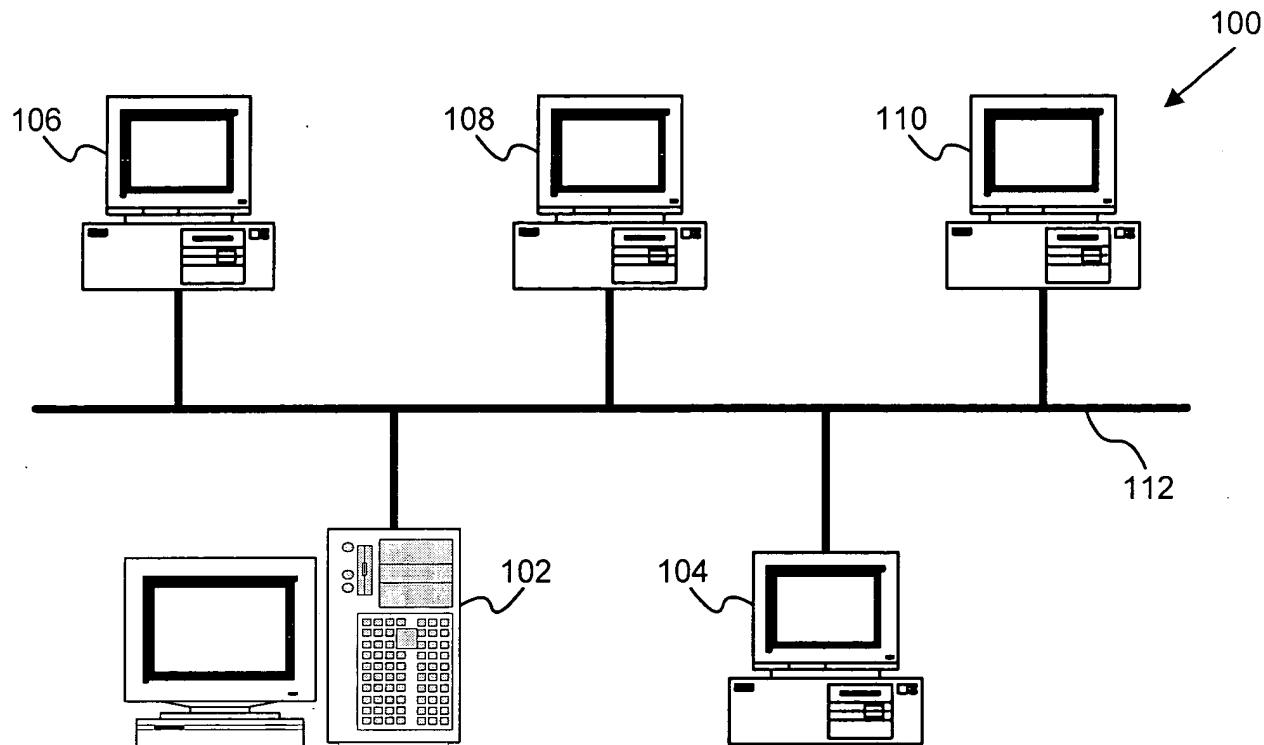
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100

106   108   110

112

102   104

FIG. 1

200

206	Operating System Files	Used Storage 202
208	Application Programs Files	
210	Data Files	
212	Overflow Storage	Free Storage 204
214	Available Storage	
216	Allocated Storage	

FIG. 2

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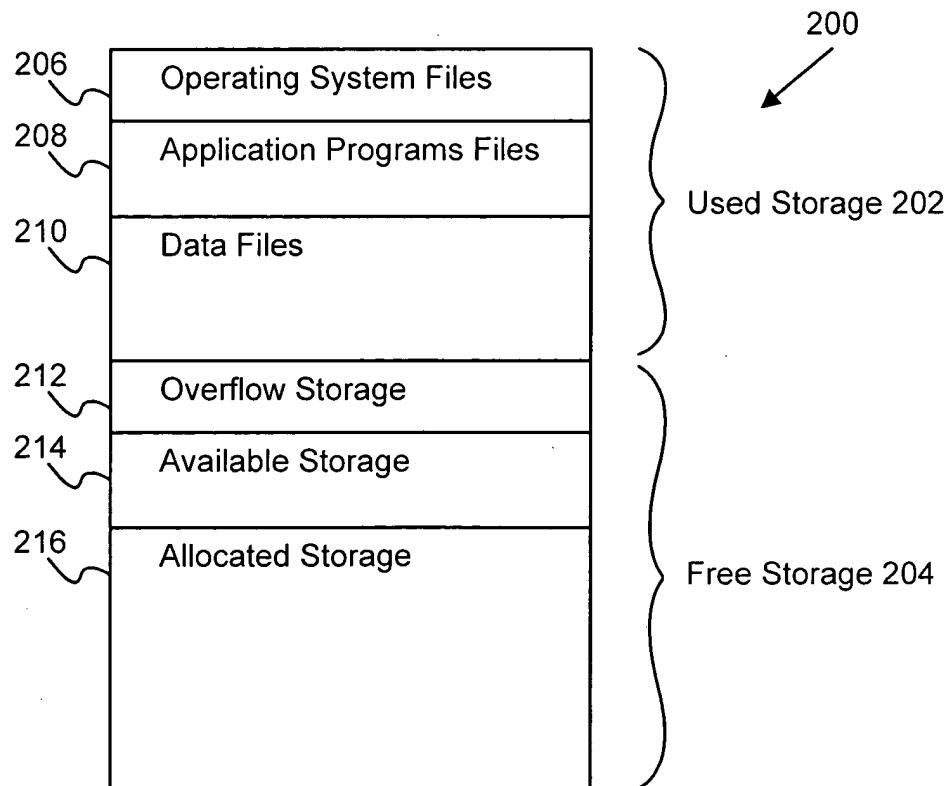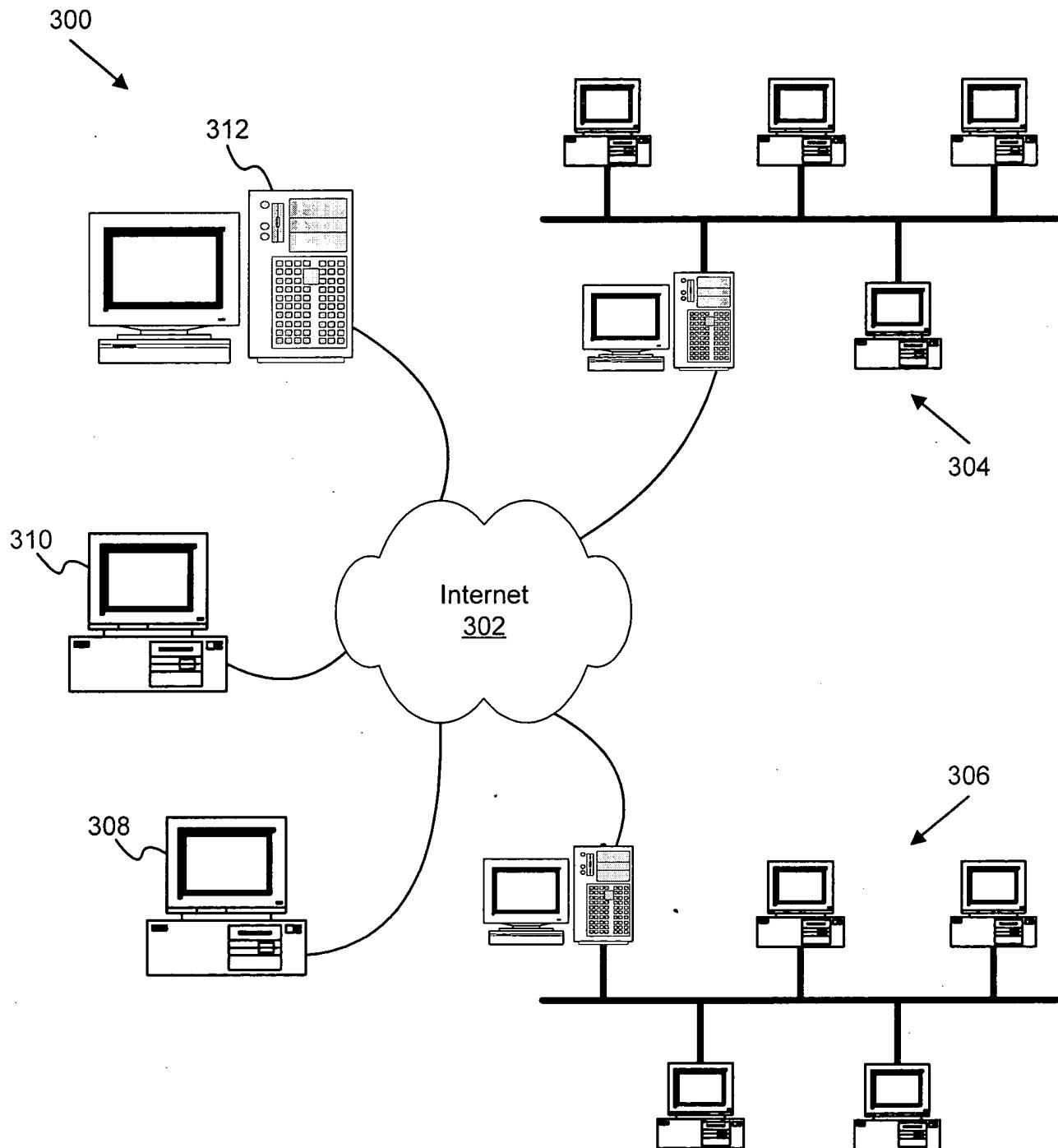Kunzler & Associates Docket No.: 1200.2.94

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FIG. 3

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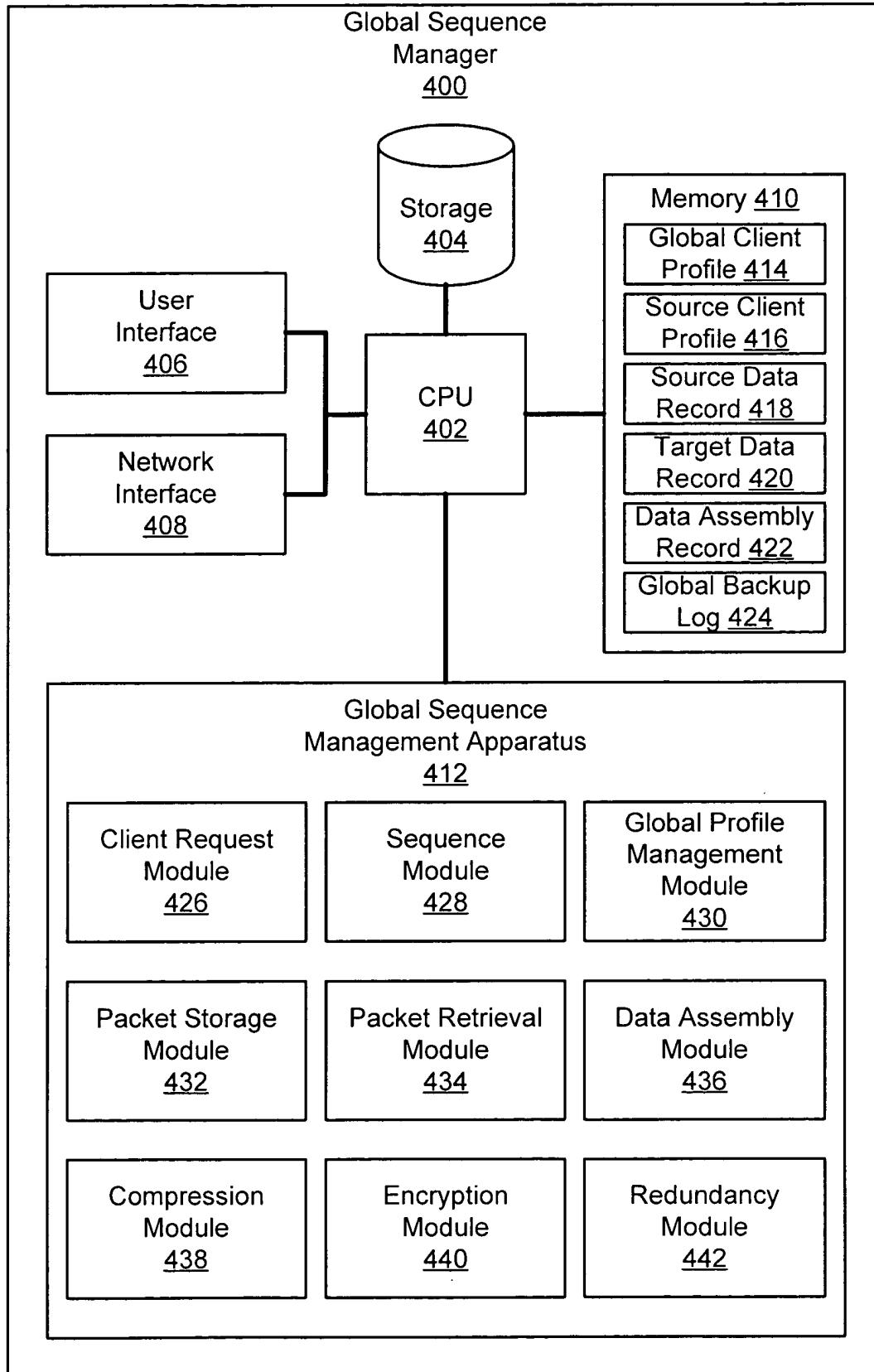Kunzler & Associates Docket No.: 1200.2.94

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Global Sequence
Manager
400

Storage
404

User
Interface
406

CPU
402

Network
Interface
408

Memory 410

Global Client
Profile 414

Source Client
Profile 416

Source Data
Record 418

Target Data
Record 420

Data Assembly
Record 422

Global Backup
Log 424

Global Sequence
Management Apparatus
412

Client Request
Module
426

Sequence
Module
428

Global Profile
Management
Module
430

Packet Storage
Module
432

Packet Retrieval
Module
434

Data Assembly
Module
436

Compression
Module
438

Encryption
Module
440

Redundancy
Module
442

FIG. 4

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Client
500

Storage
504

Memory 510

Global Client
Profile 514

Source Client
Profile 516

Target Data
Record 518

Local Source
Log 520

Local Target
Log 522

User
Interface
506

CPU
502

Network
Interface
508

Local Sequence
Management Apparatus
512

Data Backup
Module
524

Data Restore
Module
526

Local Profile Management
Module
528

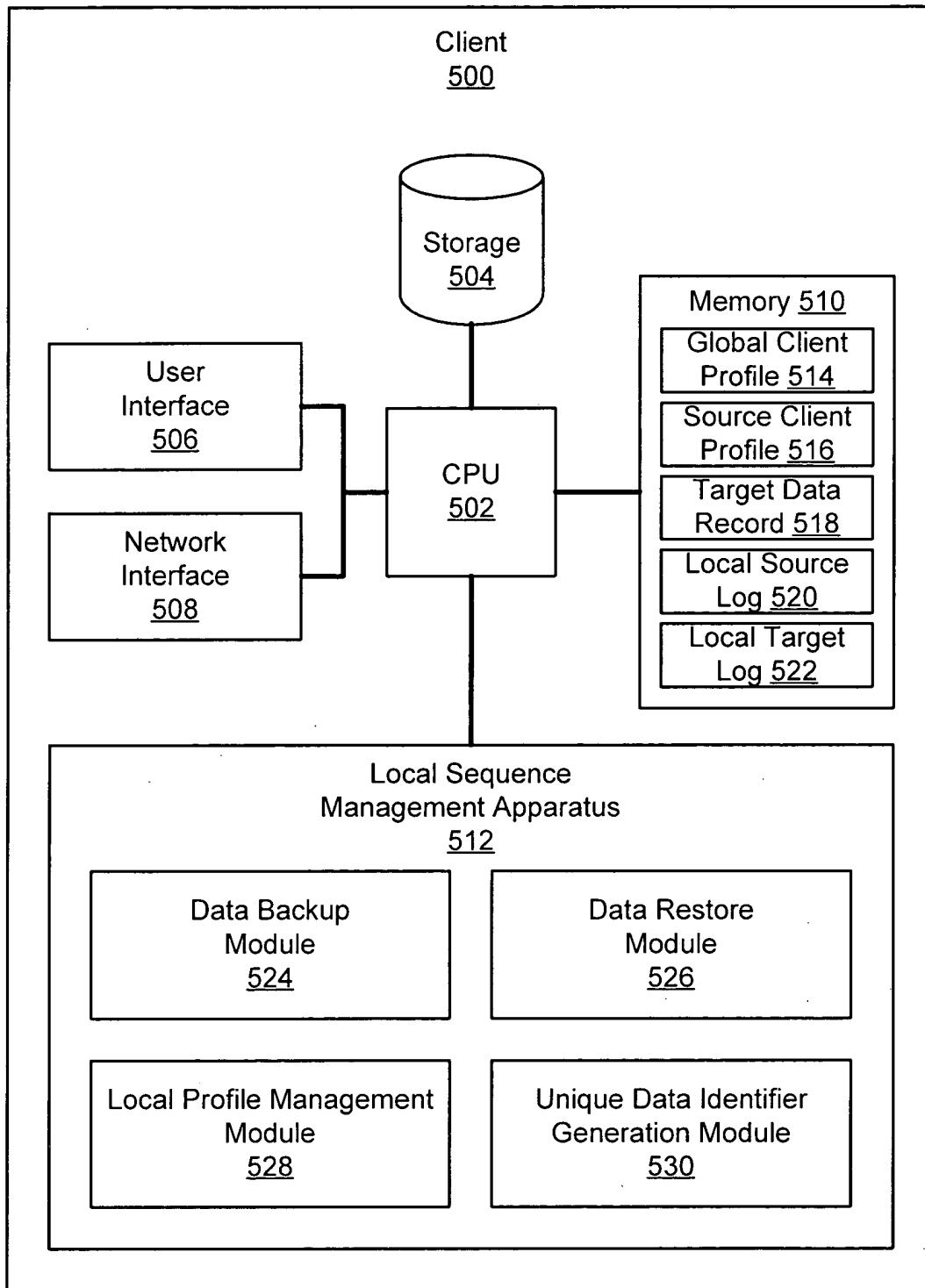Unique Data Identifier
Generation Module
530

FIG. 5

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600

Network Identifier 602	Network Allocation 604	Client Identifier 606	Client Packet Compression 608	Client Packet Redundancy 610	Client Packet Encryption 612	Client Backup Proximity 614
Client Packet Proximity 616	Client Storage 618	Client Processor 620	Client Bandwidth 622	Client Synch. 624	Client Auto Archive 626	

Global Client Profile

FIG. 6

700

Source Client Identifier 702	Unique Data Identifier 704	Data Source Location 706	Data Packet Compression 708	Data Packet Redundancy 710	Data Packet Encryption 712
Data Backup Proximity 714	Data Packet Proximity 716	Data Synch. 718	Data Sequence Key 720		

Source Client Profile

FIG. 7

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800

| Unique Data Identifier 802 | Packet Identifier 804 | Target₁ 806 | Target₂ 808 | • • • | Targetₙ 810 |

Source Data Record

FIG. 8

900

| Unique Data Identifier 902 | Packet Identifier 904 | Packet Size 906 | Target Location 908 |

Target Data Record

FIG. 9

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1000

Unique Data Identifier 1002	$Packet_{1a}$ 1004a	$Packet_{1b}$ 1004b	⋮	$Packet_{1m}$ 1004m
	$Packet_{2a}$ 1006a	$Packet_{2b}$ 1006b	⋮	$Packet_{2m}$ 1006m
	$Packet_{3a}$ 1008a	$Packet_{3b}$ 1008b	⋮	$Packet_{3m}$ 1008m
	• • •	• • •	• • • •	• • •
	$Packet_{Na}$ 1010a	$Packet_{Nb}$ 1010b	⋮	$Packet_{Nm}$ 1010m

Data Assembly Record

FIG. 10

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FIG. 11

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GLOBAL SEQUENCE MANAGER

1202 — Send Data Request to Source Client

1208 — Receive Data from Source Client

1210 — Generate Data Packets and Non-transparent Sequence Key

1212 — Store Backup Data Packets on Target Clients

1214 — Create/Update Profile and Record Entries

1216 — Send Data Backup Confirmation to Source Client

1218 — END

SOURCE CLIENT

1204 — Receive Data Request from Global Sequence Manager

1206 — Send Data to Global Sequence Manager

1220 — Receive Data Backup Confirmation from Global Sequence Manager

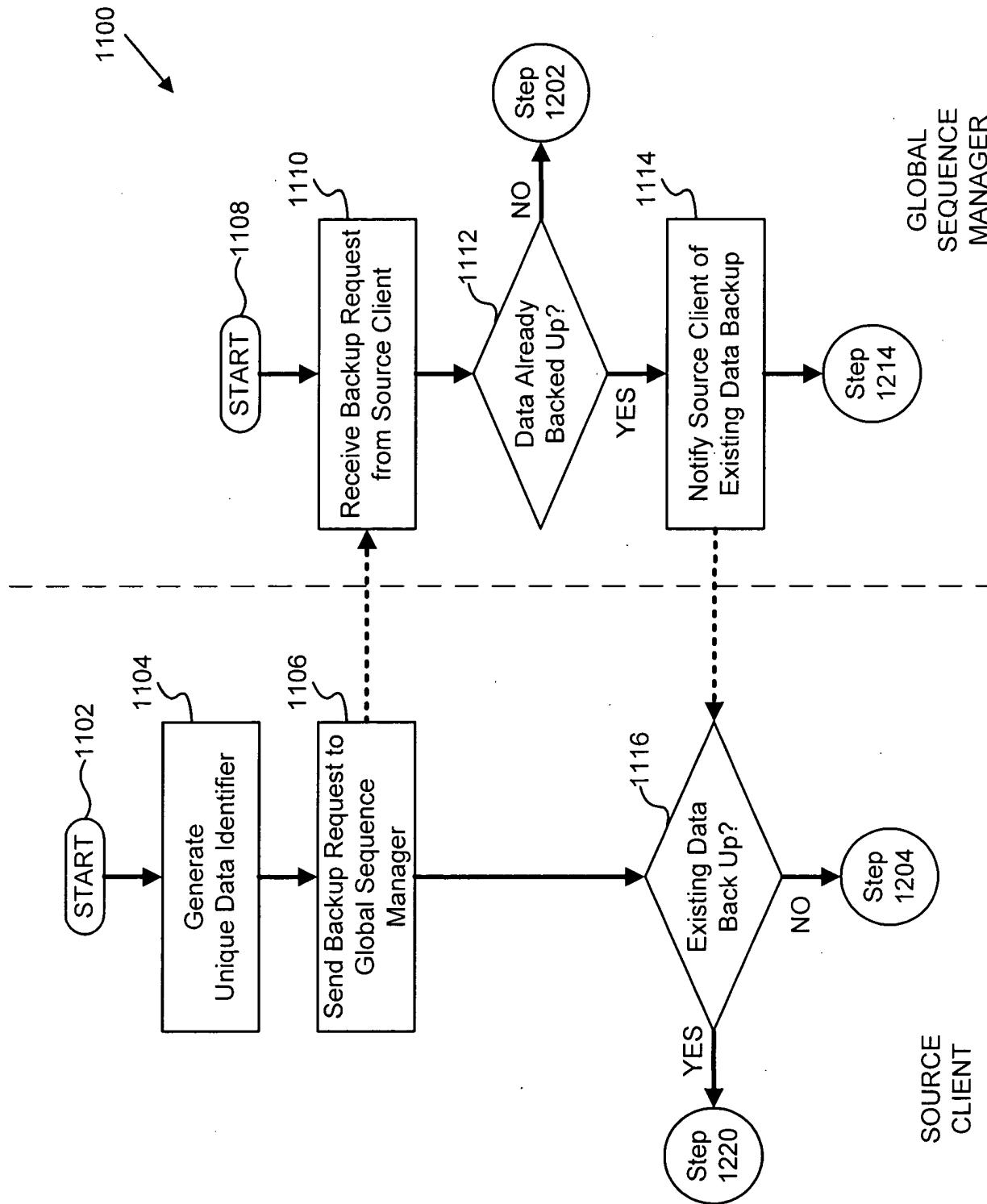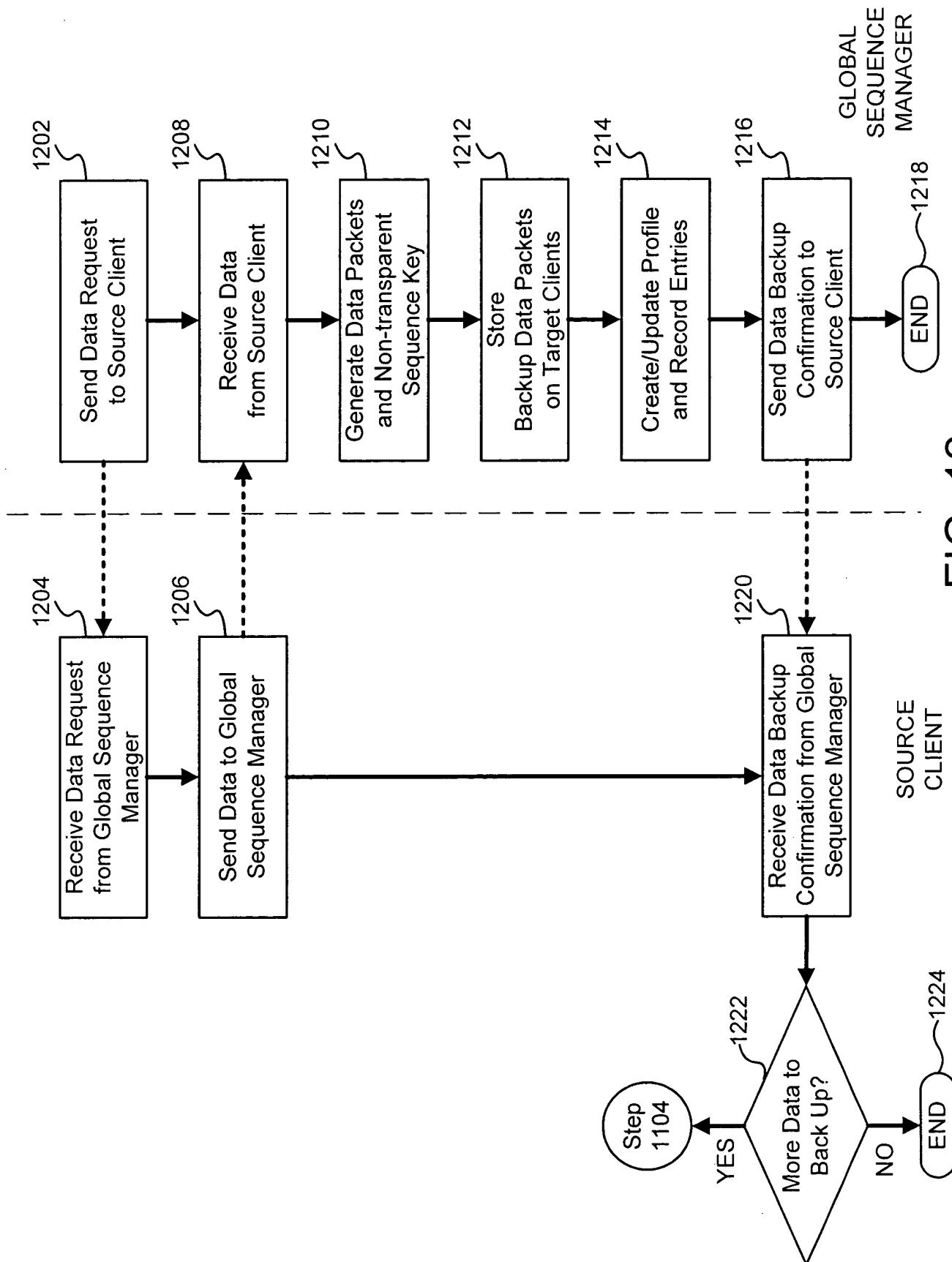1222 — More Data to Back Up?

YES — Step 1104

NO — 1224 END

FIG. 12

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FIG. 13

1300

TARGET CLIENT

START 1316

Receive Packet Request from Global Sequence Manager 1318

Step 1402

GLOBAL SEQUENCE MANAGER

START 1306

Receive Data Restore Request from Source Client 1308

Access Source Data Record or Source Client Profile 1310

Send Packet Request to Target Client 1312

Target Client Available? 1314

NO → Step 1408

YES → Step 1406

SOURCE CLIENT

START 1302

Send Data Restore Request to Global Sequence Manager 1304

Step 1512

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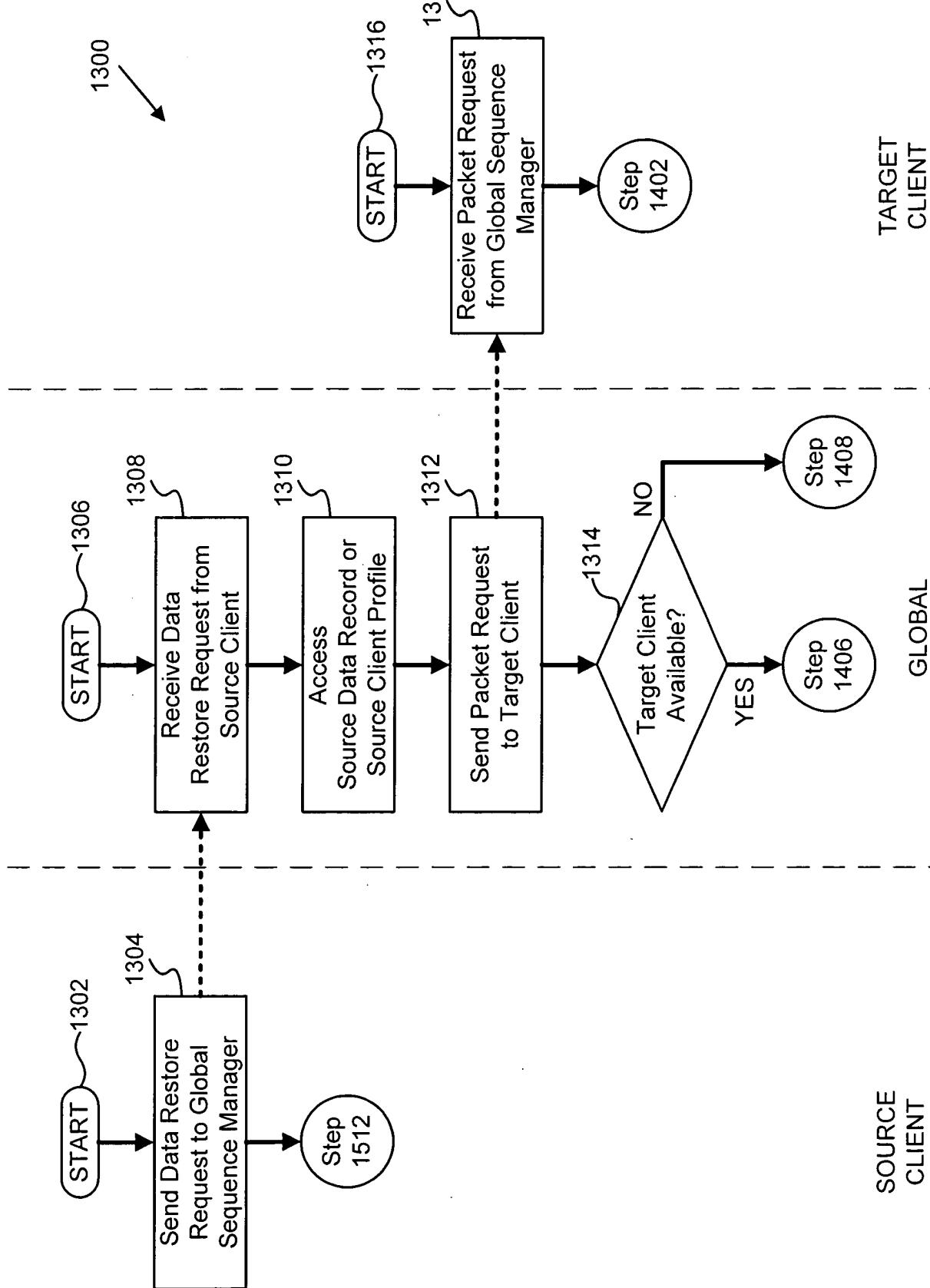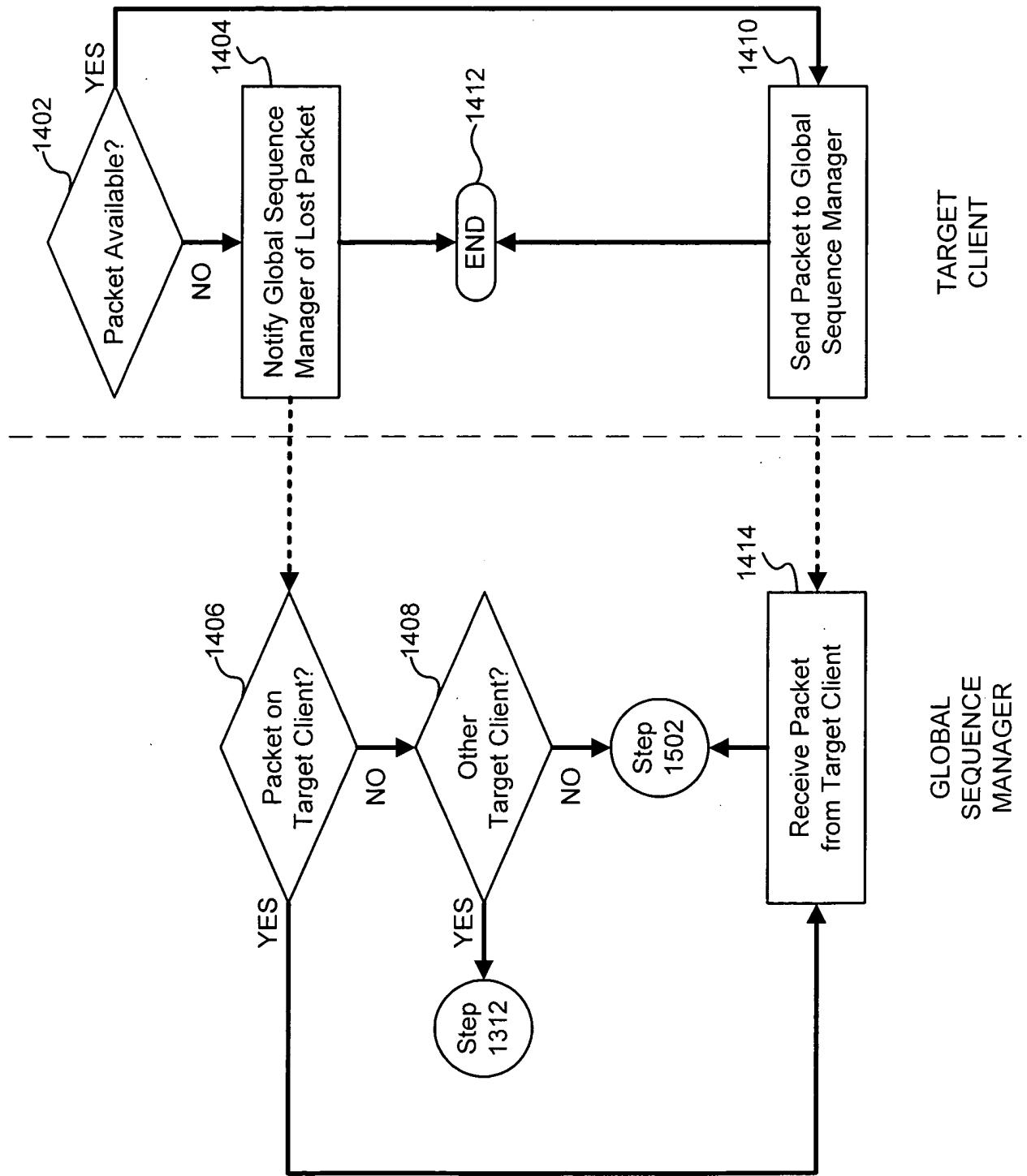Kunzler & Associates Docket No.: 1200.2.94

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TARGET CLIENT

1402 — Packet Available?

YES

NO

1404 — Notify Global Sequence Manager of Lost Packet

1412 — END

1410 — Send Packet to Global Sequence Manager

GLOBAL SEQUENCE MANAGER

1406 — Packet on Target Client?

YES

NO

1408 — Other Target Client?

YES

NO

Step 1502

Step 1312

1414 — Receive Packet from Target Client

FIG. 14

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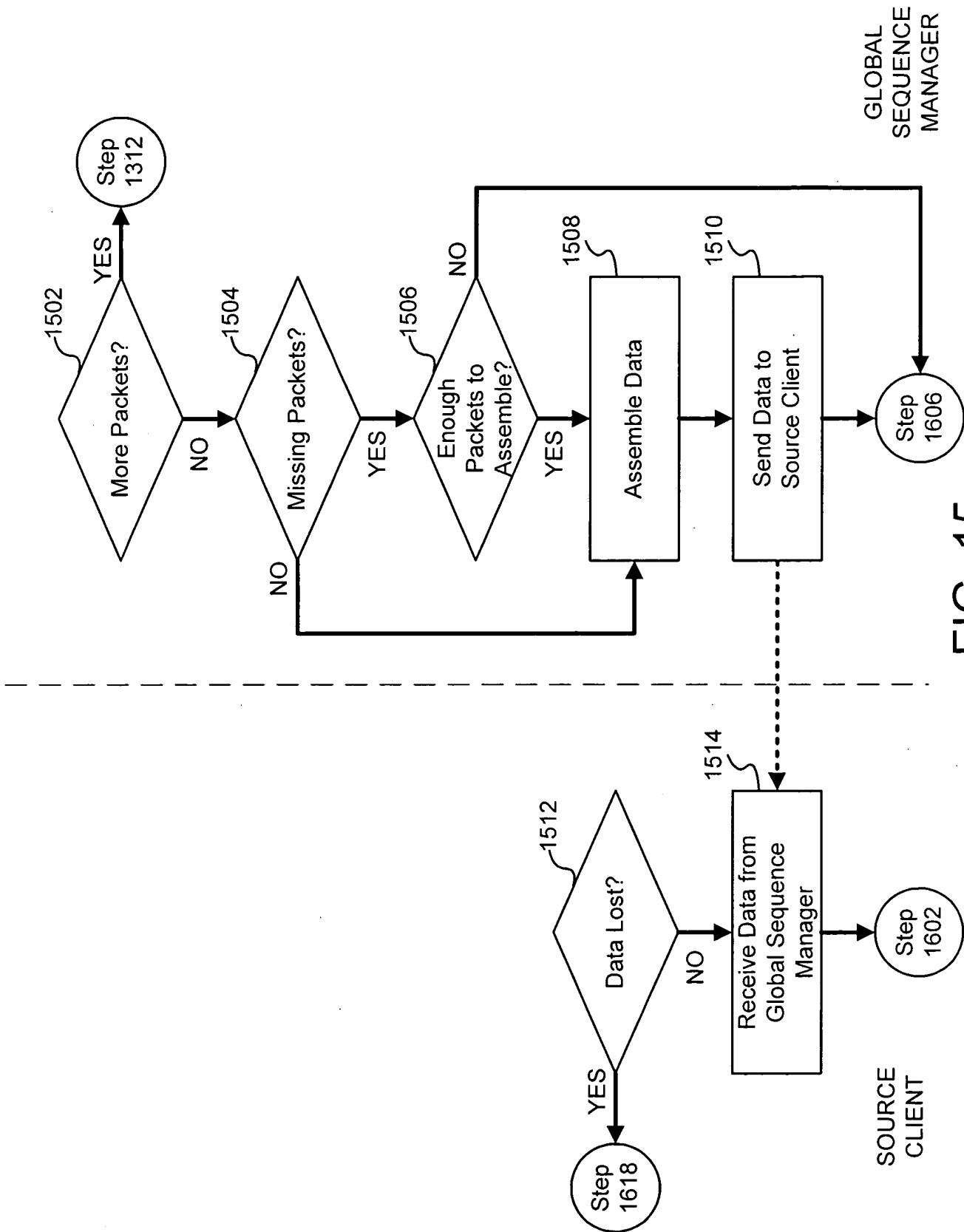Kunzler & Associates Docket No.: 1200.2.94

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FIG. 15

APPARATUS, SYSTEM, AND METHOD FOR GRID BASED DATA STORAGE
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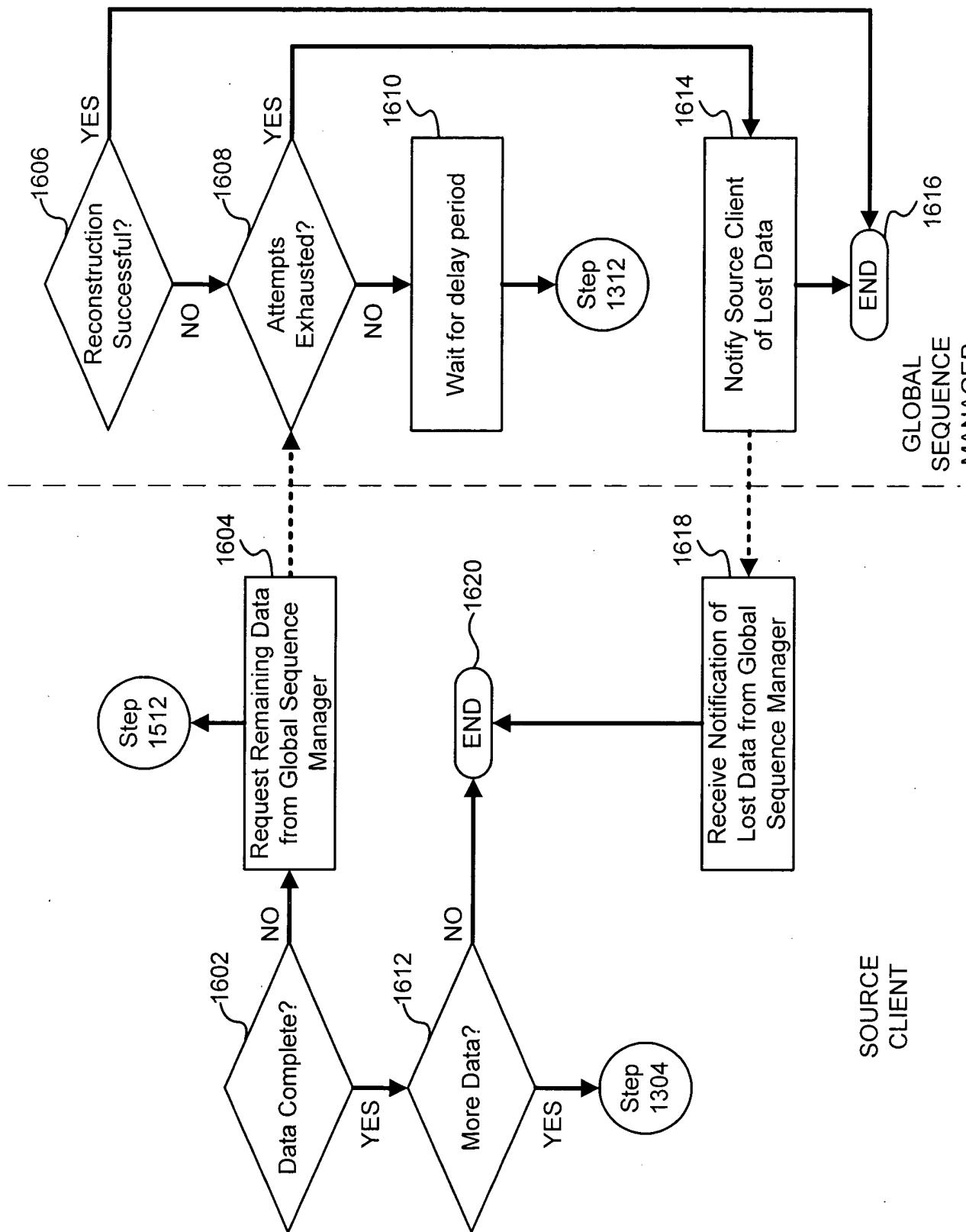FIG. 16